

Machine Service Bulletin No. 445

REFERENCE FOR TEACHING  
OF  
CALCULATING MACHINE MECHANISMS

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MONROE CALCULATING MACHINE COMPANY, INC.

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## FOREWORD

The subject matter contained in this volume has been compiled as an aid to the training of servicemen. The Machine Service Bulletins have been arranged by model in the sequence by which they should be studied and are intended only as a supplement to the teacher's lectures. They do not constitute a complete library of bulletins on the models listed but contain only the most important material relating to the course of study.

The sequence of adjustments outlined should be studied and followed very carefully. It is important for the serviceman to establish a definite adjusting procedure to assure complete coverage of the machine with the least amount of duplication and wasted effort.

Reference should be made to Index of Machine Service Bulletins, MSB #426, for detailed information on additional Service Bulletins.



# Teaching Outline

## 1 The Monroe Company and its Products

Refer to "Monroe Figuring and Accounting Equipment" - form 873-A. Outline the importance of service and the servicemen to the Company.

## 2 "L" Model

- a Functional explanation (Study MSB-420-A carefully)
- b Sequence of Adjustments (Refer to MSB-420-A)
  - 1 Align keyboard bails.
  - 2 Adjust carriage locks to selecting shaft cams with a minimum of clearance (turn eccentric stud to obtain).
  - 3 Lower carriage supports and shifter strap and adjust hinge rod supports so that there is no roll in the lower dials when the carriage is raised and lowered slightly. (Test with zeros and with 9's in the dials).
  - 4 Raise carriage supports to support the carriage in every position and give slight clearance between dial and intermediate gears.
  - 5 Raise shifter strap to give slight play between shifter and carriage.
  - 6 Remove hinge rod and raise rear of carriage sufficiently to observe left and right mesh between dial and intermediate gears. Move shifter strap to suit.
  - 7 With the hinge rod removed, observe mesh of counting finger with counting dial gear and adjust counting finger collar to obtain full sidewise hold.
  - 8 Adjust tip of the locks to ride snugly on carriage rail without knocking.
  - 9 Check all items under MSB-420-A.

## 3 "LA" Model

- a Explain operation of:
  - 1 Motor and transmission unit (MSB-422)
  - 2 Clutch yoke
  - 3 Plus and minus section
  - 4 Left side mechanism
  - 5 Double locating cams (MSB-270)
- b Sequence of adjustments to be made after "L" adjustments (Use MSB-415 chart)
  - 1 Adjust flexible end of trip lever to  $1/32$ " approximately on cycle stop arm latch (insert #5)
  - 2 Adjust trip lever to extra carry gear (insert #2). (Should center on tooth and should raise flexible end  $1/32$ " above C.S.A. latch (insert #4)
  - 3 Adjust C.S.A. latch to raise  $1/32$ " to  $1/16$ " above rock lever (insert #5). (Adjust by bending at A2)
  - 4 Adjust cycle stop arm to neutralizing stud on clutch yoke (insert #14). Make sure stud does not bottom in aperture or rub on top of aperture.
  - 5 Hold machine at the bumper and adjust eccentric on clutch yoke click (2712) to position click in the center of the neutral notch of the clutch yoke and set stop so that click will just clear positioning notches on clutch yoke.



## "LA" Model - Continued

- 6 Plus and minus tips of the clutch yoke must engage transmission with approximately a 3/4 hold (insert #17). Bend minus arm to adjust. Make sure clutch yoke tip centers on transmission lugs and that clutch yoke is absolutely free.
  - 7 Adjust set screws on square block on plus and minus rock shaft to center the 57-711 latch in the notch of the clutch yoke positioner 2717.
  - 8 Adjust the clutch yoke operating arm 4710 for equal throw into plus and minus.
  - 9 Adjust quick stroke latch (27-780) to drop under step in stopping lever simultaneously or SLIGHTLY before the lifting blank falls under the offset of flexible end of the trip lever.
  - 10 Adjust stud on (27-778) bracket so that lifter will raise trip lever 1/32" above cycle arm latch and position in front of trip lever offset when neutralized.
  - 11 Adjust switch closing arm (41-714 - insert #13) through its eccentric to center on the clutch yoke pin in neutral.
  - 12 Adjust switch blades (insert #12). Lower blade should exert enough pressure on switch arm to raise stop arm. Excessive tension causes hard plus and minus action.
  - 13 Adjust stop arm (See MSB-288).
  - 14 Adjust friction clutch (MSB-415, page 1).
  - 15 Adjust machine speed to 380 R.P.M.
- c "LA" quiz.

## 4 "LA-5" Model

- a Functional explanation.
  - b Sequence of adjustments (to follow "L" and "LA" adjustments)
    - 1 Adjust eccentric "U" (chart with MSB-415) to latch clutch yoke extension with slight excess.
    - 2 Adjust clutch yoke extension for full throw into plus and minus without cramping (MSB-193, plates 3 and 4).
    - 3 Adjust shift mechanism (MSB-415).
    - 4 Adjust division return mechanism MSB-177).
    - 5 Adjust eccentric "N" (MSB-193, plate 2) so that with the division lever returned to neutral and the clutch yoke moving into plus, the clutch yoke extension latch "K" will unlatch when the clutch yoke engages the transmission lug with 1/2 hold.
    - 6 Adjust keyboard lock (MSB-284).
    - 7 Study MSB-193, 415, 358, 376 and 404.
- c "LA 5" quiz..

## 5 "LA-6" Model

- a Functional explanation
- b Sequence of adjustments.
  - 1 Remove box.
  - 2 Adjust carriage carefully.
  - 3 Make "LA 5" adjustments.
  - 4 Reassemble box and align it to carriage.
  - 5 Follow adjustments in MSB-161 but omit plates 4 and 9.
  - 6 Study Change of Design bulletins.
  - 7 "LA" 6" quiz.



## LA-6 Quiz

- 1 List in order the strokes made by the machine in multiplying 11 x 11.
- 2 What would you expect to find out of adjustment if the machine continued to run at the end of a multiplication? At least five.
- 3 Explain briefly how the constant dial mechanism retains a figure.
- 4 What would you look for and how would you correct a "1" failing to clear from the first upper dial.
- 5 Name three causes of and the correction for a figure in the constant changing during a clearing operation.
- 6 Explain how you would adjust the multiplication trip mechanism.
- 7 Name the common causes for lockups on carry-over through the box.
- 8 How would you adjust the multiplication counting finger?
- 9 Why is it necessary to divorce the tripper from its flexible end during multiplication?
- 10 What would you expect to find wrong if the machine made one or more reverse cycles after a carriage shift in multiplication?